

SPUT

Dart Aerospace Ltd.

Date: Monday, 18/08/2008 10:26:53 AM
User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : ARM
Job Number : 41287
Estimate Number : 12882
P.O. Number :
This Issue : 18/08/2008 S.O. No. :
Prsht Rev. : NC Part Number : D3560042
First Issue : / / Type : MACHINED PARTS Drawing Number : D3560 REV D
Previous Run : 35404 Drawing Revision : D
Material :
Due Date : 10/09/2008 Qty: 10 Um: Each
Written By :
Checked & Approved By : JUL 08.8.18
Comment : Est Rev:A New Issue 07.05.24 EC
est rev B ECN 987 07.10.09 EC verified by: DD
Est Rev:C ECN1048 07-12-18 DD verified by: EC

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 M6061T6B0500X05000 6061-T6 Bar .500 x 5.00



Comment: Qty.: 1.4648 f(s)/Unit Total: 14.6475 f(s)

6061-T6 Bar 0.50" x 5.00"

Batch: M109025 / not in computer

JL 08/08/25

2.0 BAND SAW BAND SAW



Comment: BAND SAW

Cut blanks 16.750" long

JL 08/08/25

3.0 HAAS1 HAAS CNC VERTICAL MACHINING #1



Comment: HAAS CNC VERTICAL MACHINING #1

1- Mill as per Folio FA694 Rev: AA & Dwg D3560 Rev: D

2-C'sink 0.196" hole on manual mill as per dwg D3560

3-Deburr per dwg D3560

DTP 08/08/26

(10)

4.0 QC2 INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

DTP 08/08/26

(10)

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ARM

Job Number: 41287

Part Number: D3560042

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

QC8

SECOND CHECK



Comment: SECOND CHECK

SA 08/09/02 (10)

6.0

D35921

Plate



Comment: Qty.: 1.0000 Each(s)/Unit Total 10.0000 Each(s)
PLATE B 41083 ✓

SP 08.09.09 (3X)

7.0

LARGE FAB 1

LARGE FABRICATION RESOURCE 1



Comment: LARGE FABRICATION RESOURCE 1

1-Weld assembly as per dwg D3560

STEP:

- 1- clean material (buff bracket and bottom of arm with blue pad) SP
- 2- set up bracket and arm on jig SP
- 3- preheat bracket and arm with torch SP
- 4- clean before welding with brush SP
- 5- set up machine to 135 amps SP
- 6- weld across bottom and top ends SP
- 7- reheat with torch (65 deg C) SP
- 8- on one side weld from bottom to top half way SP
- 9- same for other side (half way) SP
- 10- from half way point weld the rest of the first side (ease off pedal near end) SP
- 11- same for remaining side (ease off pedal near end) SP

08.09.09 (3X)

8.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08/09/02 (12) P70

9.0

QC9

VISUAL WELDING INSPECTION



Comment: VISUAL WELDING INSPECTION

08.09.09 (2)

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: D3560-042 PAR #: N/A Fault Category: Prod / Fin. Large NCR: (Yes) No DQA: D Date: 08/09/22
 QA: N/C Closed: D Date: 08/09/22

| NCR: <u>41287</u> | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|-------------------|------|---|-----------------------------|---|-----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| 8/9/19 | 2 | one arm was found with a crack in the plate D35821 from welding R.C. grain runs along the weld. | <u>AR</u> 08/09/15 | Scrap and destroy no Replce <u>QH</u> <u>(+)</u> As per email from David Stephens to Alton Stalker on 8/11/10 @ 1:36 pm See CAR 08-026 | 08/09/17 SAD | <u>(C)</u> 08/09/17 | <u>AR</u> 08/09/15 | <u>S</u> 08/09/17 |
| | | | | | <u>08-09-11</u> | | | <u>S</u> 08/09/10 |
| | | | | | | | | |

NOTE: Date & initial all entries

Date: Monday, 18/08/2008 10:26:53 AM
User: Julie Lecocq

Process Sheet

Customer: CU DAR001 Dart Helicopters Services

Drawing Name: ARM

Job Number: 41287

Part Number: D3560042

Job Number:



Seq. #:

Machine Or Operation:

Description :

10.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

M-L 08/09/17 (2x)

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

08-09-17

(x2)

12.0

D2808

Bushing



Comment: Qty.: 1.0000 Each(s)/Unit Total : 10.0000 Each(s)
Spacer

B37113

08/09/18

13.0

SMALL FAB 1

SMALL & MEDIUM FAB RESOURCE 1



Comment: SMALL & MEDIUM FAB RESOURCE 1

1-Press bushing in D3560 arm per dwg D3562

08/07/18 (2)

14.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08/09/18

15.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: *152*

8/9/18

(x2)

SC

16.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/09/19

Job Completion



-MF 08-09-19

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

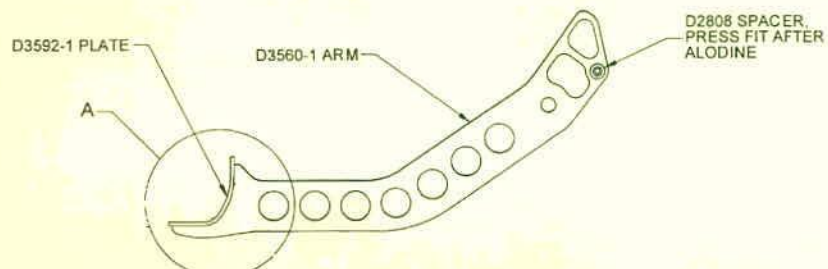
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

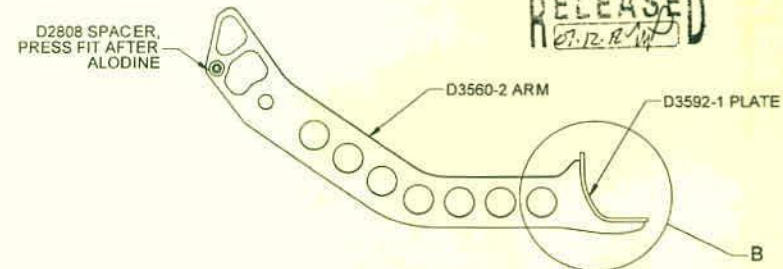
| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

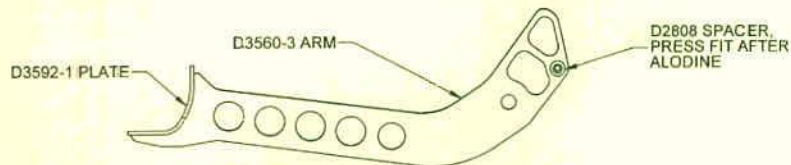
RELEASED
07.12.16



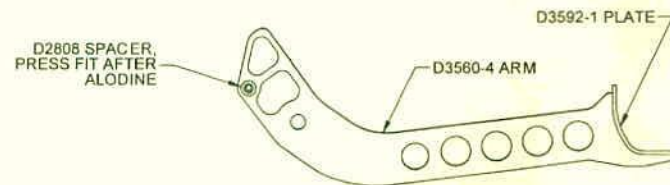
D3560-041 ARM WELDMENT



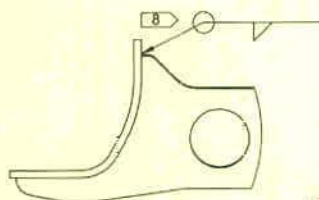
D3560-042 ARM WELDMENT



D3560-043 ARM WELDMENT



D3560-044 ARM WELDMENT



**DETAIL A
SCALE 1 : 2**

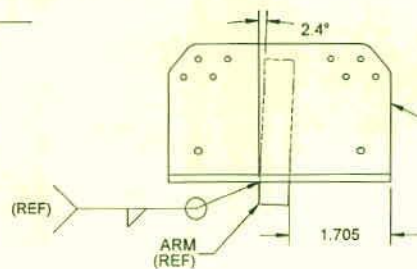
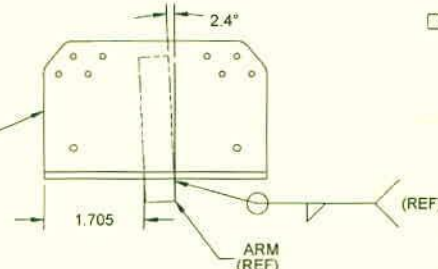
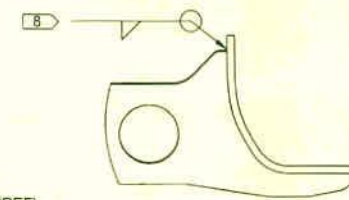


PLATE
(REF)



ARM
(REF)



**DETAIL B
SCALE 1 : 2**

PARTS LIST

| QTY -041 | QTY -042 | QTY -043 | QTY -044 | P/N | DESCRIPTION |
|-------------|-------------|-------------|-------------|-----------|--------------|
| X | | | | D3560-041 | ARM WELDMENT |
| | X | | | D3560-042 | ARM WELDMENT |
| | | X | | D3560-043 | ARM WELDMENT |
| | | | X | D3560-044 | ARM WELDMENT |
| 1 | 1 | 1 | 1 | D2808 | SPACER |
| 1 | | | | D3560-1 | ARM |
| | 1 | | | D3560-2 | ARM |
| | | 1 | | D3560-3 | ARM |
| | | | 1 | D3560-4 | ARM |
| 1 | 1 | 1 | 1 | D3592-1 | PLATE |

| | | | |
|------------|---|----|----------|
| DESIGN | ADD D2808 PRESS FIT NOTE; REDRAWN IN SOLIDWORKS | DC | 07.11.16 |
| DRAWN | REMOVE POWDER COAT | CP | 07.06.19 |
| CHECKED | REDESIGN AS WELDMENT, ADD POCKETS | CP | 07.01.15 |
| MFG. APPR. | NEW ISSUE | CP | 08.09.25 |
| APPROVED | | BY | DATE |
| DE APPR. | | | |
| DATE | 07.11.16 | | |

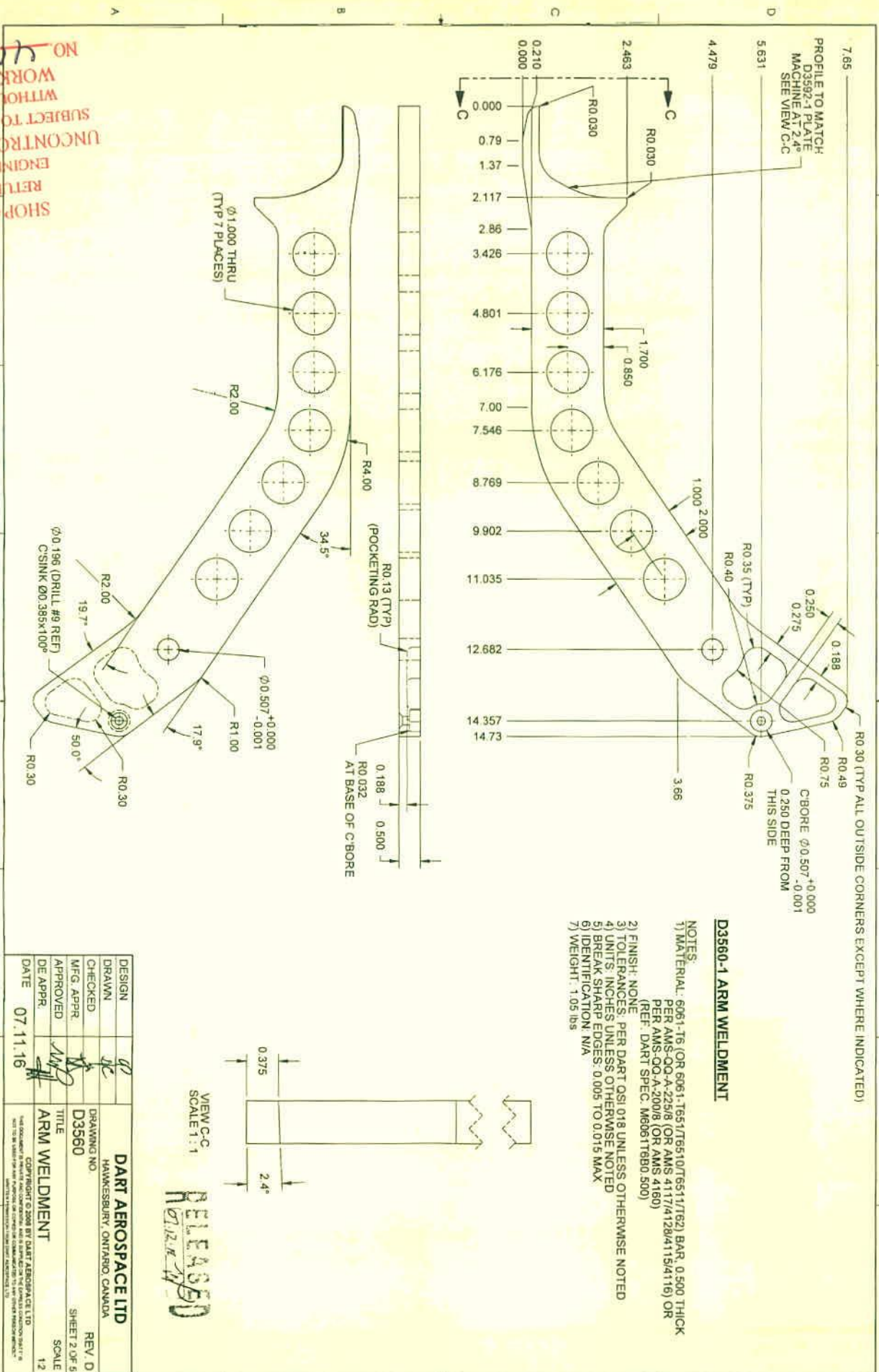
DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. **D3560** REV. D
TITLE **ARM WELDMENT** SHEET 1 OF 5
SCALE 1:4

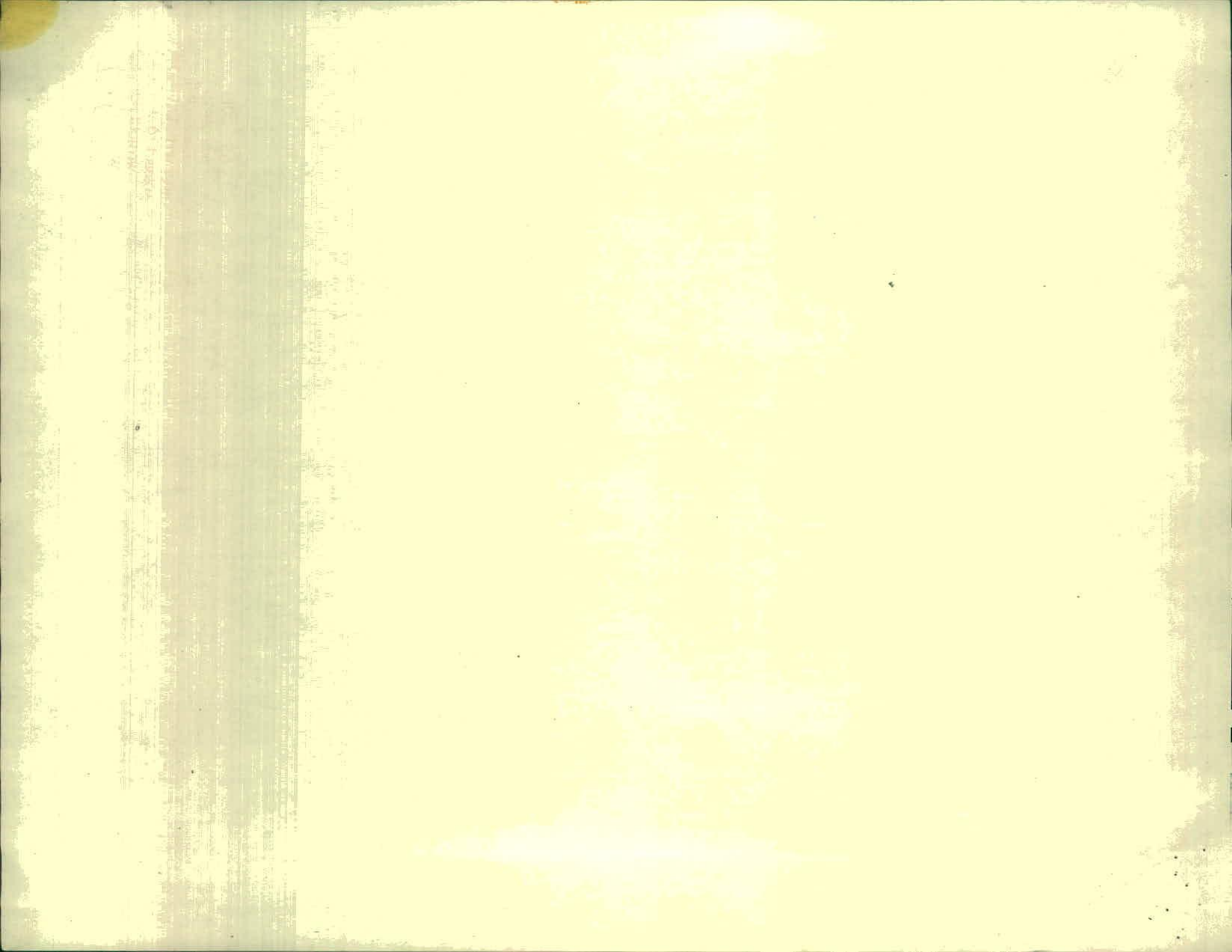
COPYRIGHT © 2006 BY DART AEROSPACE LTD
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESSED CONDITION THAT IT IS
NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT
WRITTEN PERMISSION FROM DART AEROSPACE LTD

- NOTES:**
1) MATERIAL: N/A
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
4) UNITS: INCHES UNLESS OTHERWISE NOTED
5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
6) IDENTIFICATION: N/A
7) WEIGHT: 1.23 lbs (TYP)
8) WELDING: PER DART QSI 004

WORK ORDER NO. 41287
 SUBJECT TO AMENDMENT WITHOUT NOTICE
 UNCONTROLLED COPY
 RETURN TO
 ENGINEERING
 COPY

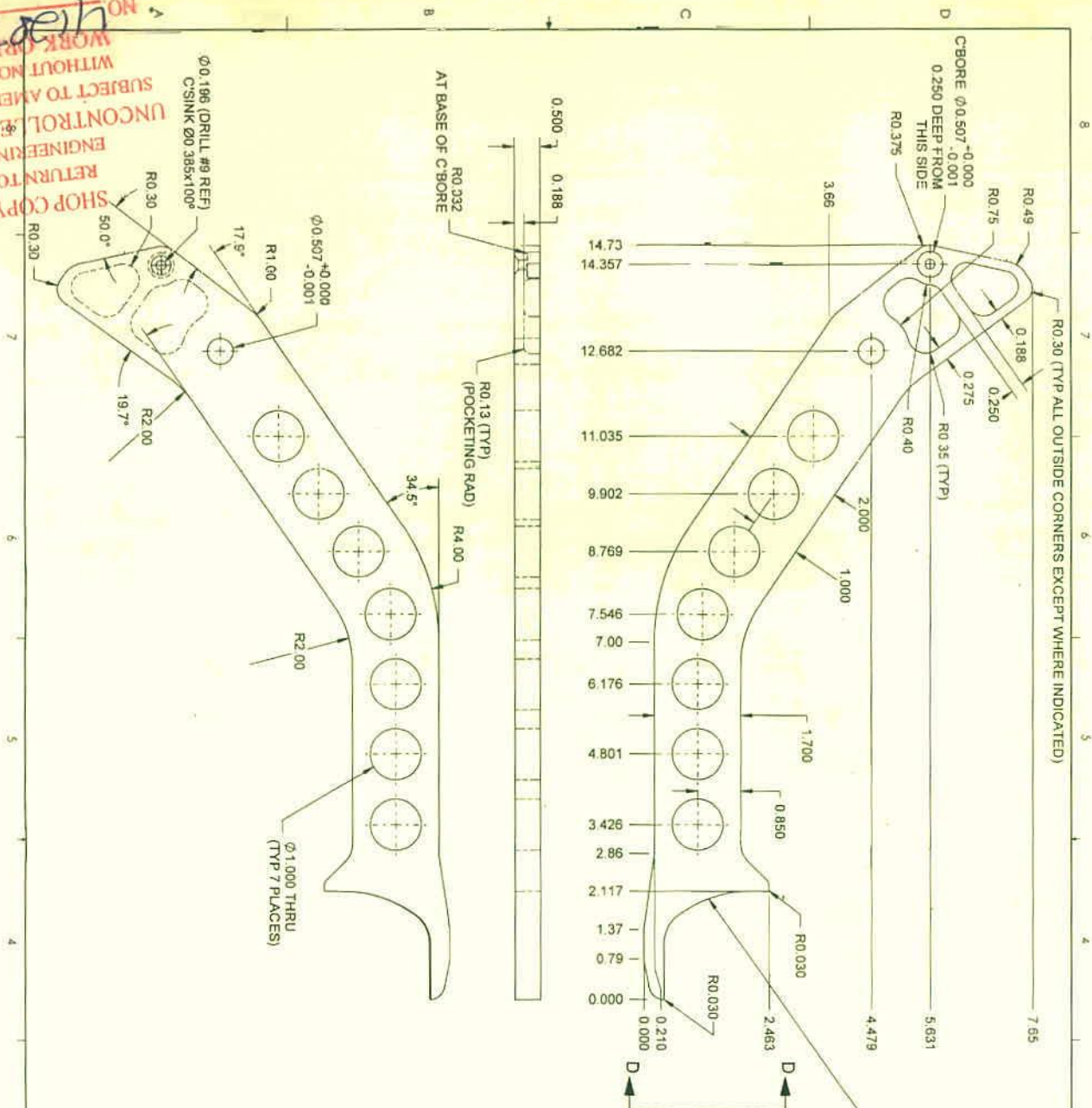


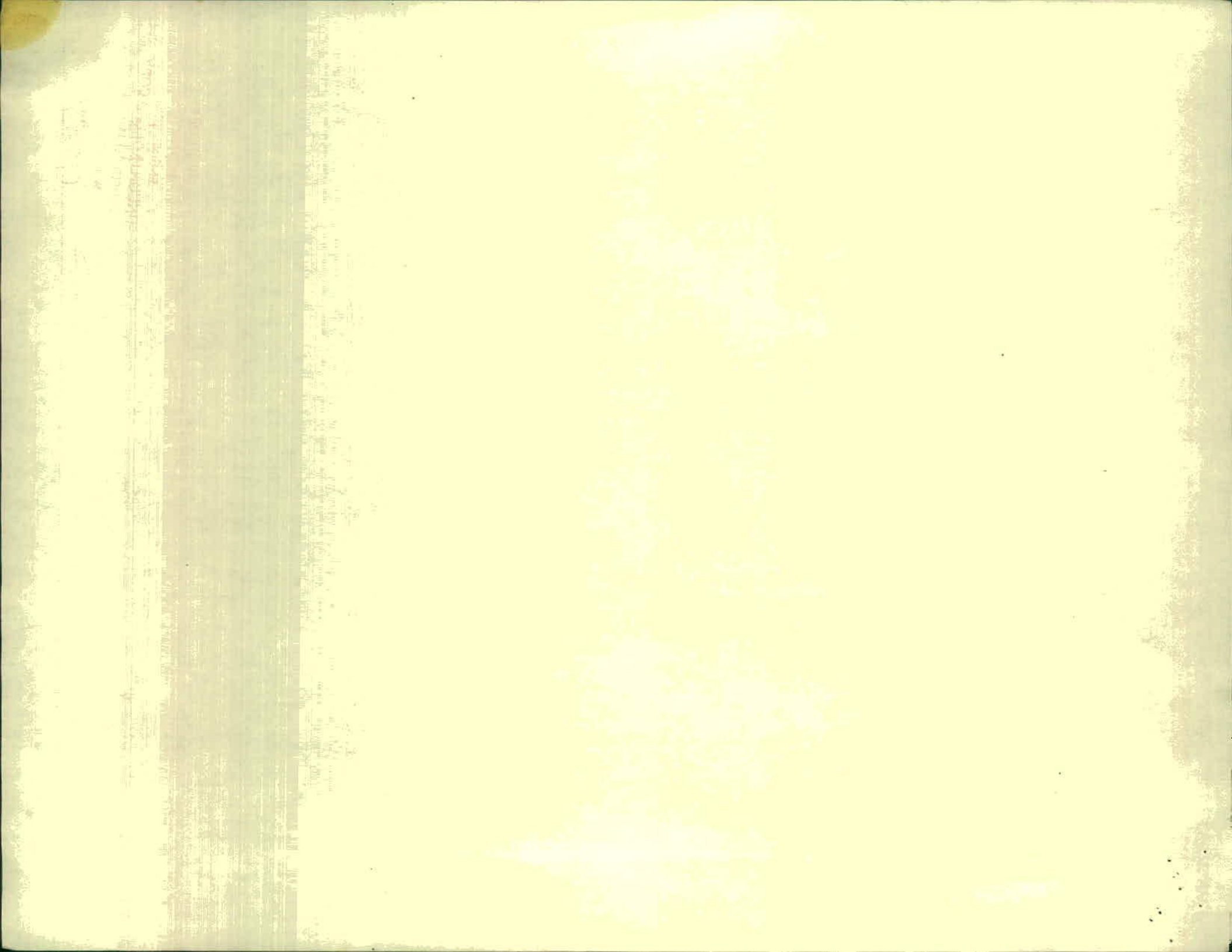
RECEIVED
JAN 12 1914



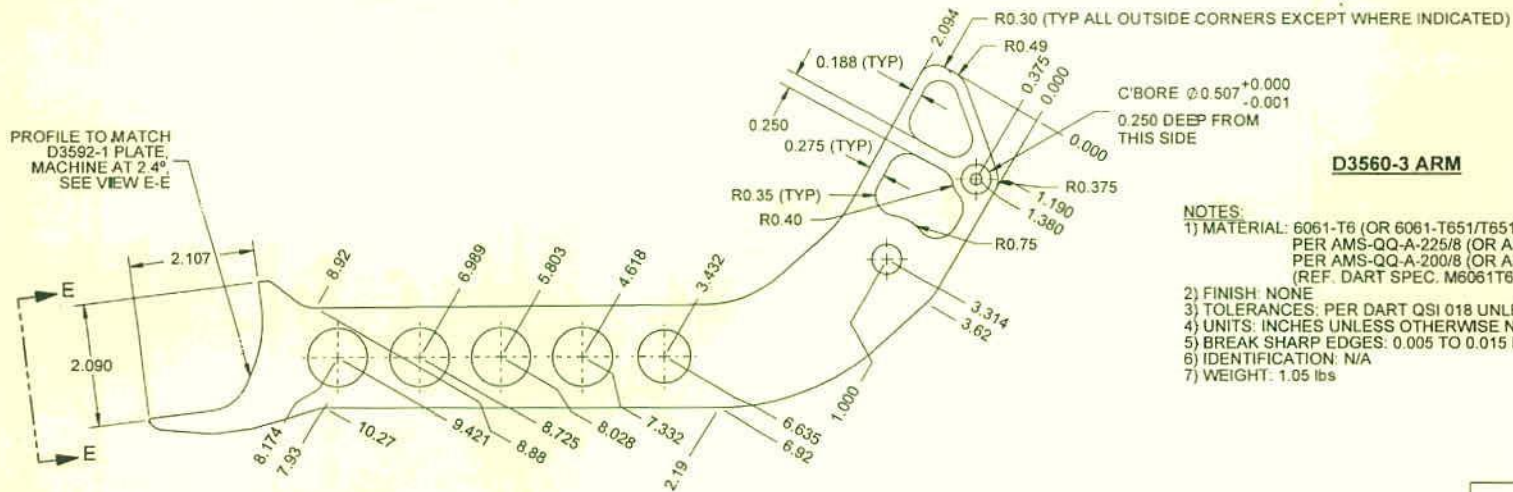
| | | |
|--|-----------|---|
| DESIGN | <i>q</i> | DART AEROSPACE LTD 144 WESSBURY, ONTARIO, CANADA DRAWING NO. D3560 REV. D SHEET 3 OF 4 SCALE 1:2 |
| DRAWN | <i>sc</i> | |
| CHECKED | <i>sc</i> | |
| MFG. APPR. | <i>sc</i> | |
| APPROVED | <i>sc</i> | |
| DE APPR. | <i>sc</i> | TITLE |
| DATE | 07.11.16 | ARM WELDMENT |
| NOT FOR CONSTRUCTION THIS DRAWING IS THE PROPERTY OF DART AEROSPACE LTD. IT IS TO BE USED ONLY FOR THE PURPOSES SPECIFIED AND IS NOT TO BE REPRODUCED OR USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD. | | COPY RIGHT © 2006 BY DART AEROSPACE LTD. ALL RIGHTS RESERVED THIS DRAWING IS THE PROPERTY OF DART AEROSPACE LTD. IT IS TO BE USED ONLY FOR THE PURPOSES SPECIFIED AND IS NOT TO BE REPRODUCED OR USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD. |

NO
WORK ORDER
WITHOUT NOTICE
SUBJECT TO AMENDMENT
UNCONTROLLED COPY
ENGINEERING
RETURN TO
SHOP COPY





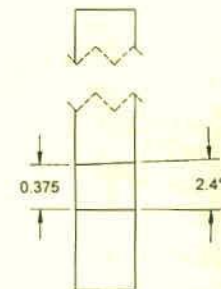
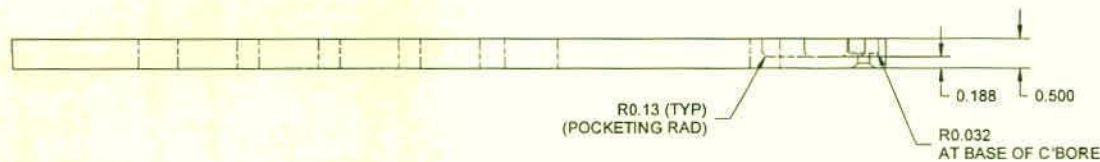
PROFILE TO MATCH
D3592-1 PLATE
MACHINE AT 2.4°
SEE VIEW E-E



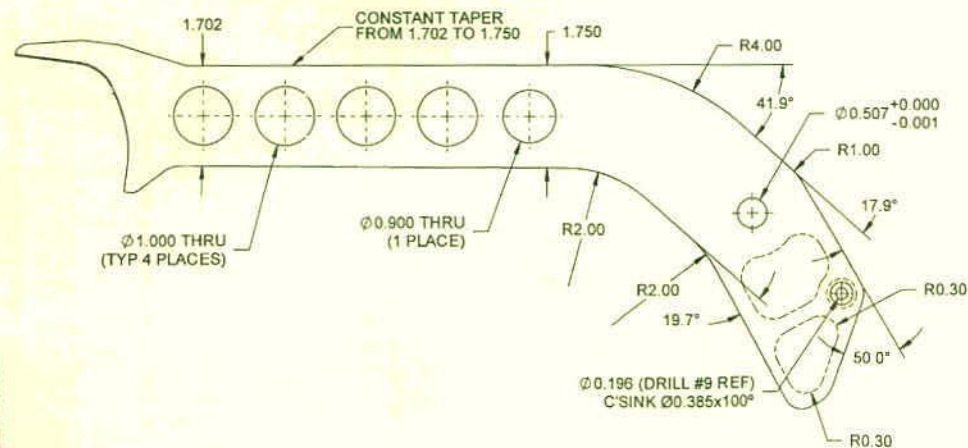
D3560-3 ARM

NOTES:

- 1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK
PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR
PER AMS-QQ-A-200/8 (OR AMS 4160)
(REF. DART SPEC. M6061T6B0.500)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: 1.05 lbs



VIEW E-E
SCALE 1:1



| | | | |
|---|----------|--|--------------|
| DESIGN | 40 | DART AEROSPACE LTD | |
| DRAWN | 4C | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | 4C | DRAWING NO. | REV. D |
| MFG. APPR. | 4C | D3560 | SHEET 4 OF 5 |
| APPROVED | 4C | TITLE | SCALE |
| DE APPR. | 4C | ARM WELDMENT | 1.2 |
| DATE | 07.11.16 | COPYRIGHT © 2008 BY DART AEROSPACE LTD | |
| THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | | | |

NO 41287
WORK ORDER
WITHOUT NOTICE
SUBJECT TO AMENDMENT
UNCONTROLLED COPY
ENGINEERING
RETURN TO
SHOP COPY



From: David Shepherd [mailto:dshepherd@dartaero.com]
Sent: September 10, 2008 1:36 PM
To: 'Alan Stocker'
Cc: 'Chris Provencal'; 'Mike Petsche'; 'Bill Beckett'; 'Susanne Sheldon'
Subject: RE: D3560-044 & -042 Cracking

Alan,

Thanks for the pictures.
I am not comfortable with any sort of repair to these parts.
I think that all 14 parts should be scrapped.
And, at the risk of stating the obvious, we need to revisit the manufacturing process of this joint.
My preference, as it was a couple of years ago, is to eliminate this weld.
However, the geometry in that area is a little tricky.
Suggest we generate an NCR or PAR or whatever.

David

From: Alan Stocker [mailto:astocker@dartaero.com]
Sent: Wednesday, September 10, 2008 10:26 AM
To: 'David Shepherd'
Cc: 'Chris Provencal'; 'Mike Petsche'
Subject: D3560-044 & -042 Cracking

Good morning,

We have 13x D3560-044 and 1x D3560-042 that have cracks all but 1 in the same location.
Attached image D3560-044 Crack 1 shows where 13 of the 14 cracks occurred. D3560-044
Crack 2 shows where the other crack occurred. The cracks shown in D3560-044 Crack 1 vary in
depth from roughly 3/32 to 1/2 inch. I discussed this with Chris and Peter the consensus opinion is
the parts are scrap. Further discussion with Chris indicates that changing grain direction to 45
degree on the sheet metal part may lower the scrap rate but not eliminate it. This has been done
on a previous deviation with a less scrap. D3560-044 Crack 2 appears to just be an anomaly.

Please disposition all 14 parts.

Regards,

Alan Stocker
Mechanical Designer

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, Ontario
CANADA K6A 1K7

Phone: 613 632 5200 x 241
FAX : 1 613 632 5246

astocker@dartaero.com

